



OCT : Clinical applications in complex coronary interventions

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Argentina



OCT & Complex Angioplasty

**Restenosis
Thrombosis**

**Bifucation
Lesions**

complex angioplasty?

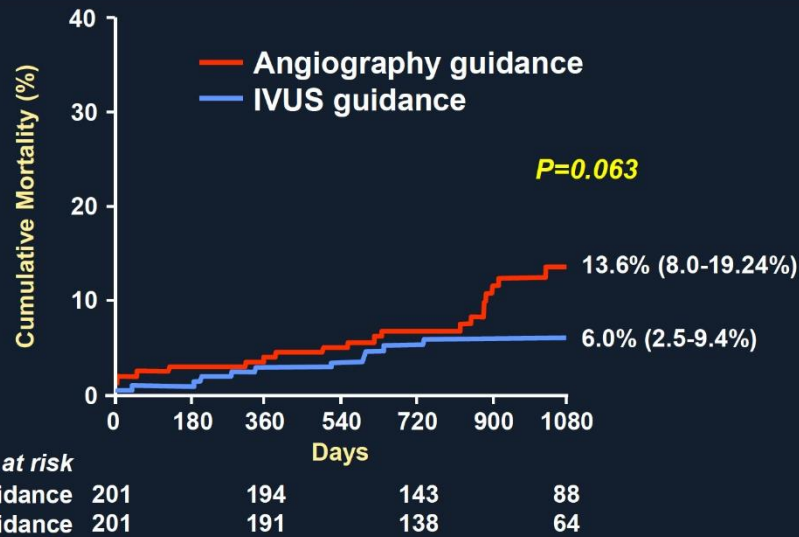
Left main

**Calcified
Lesions**

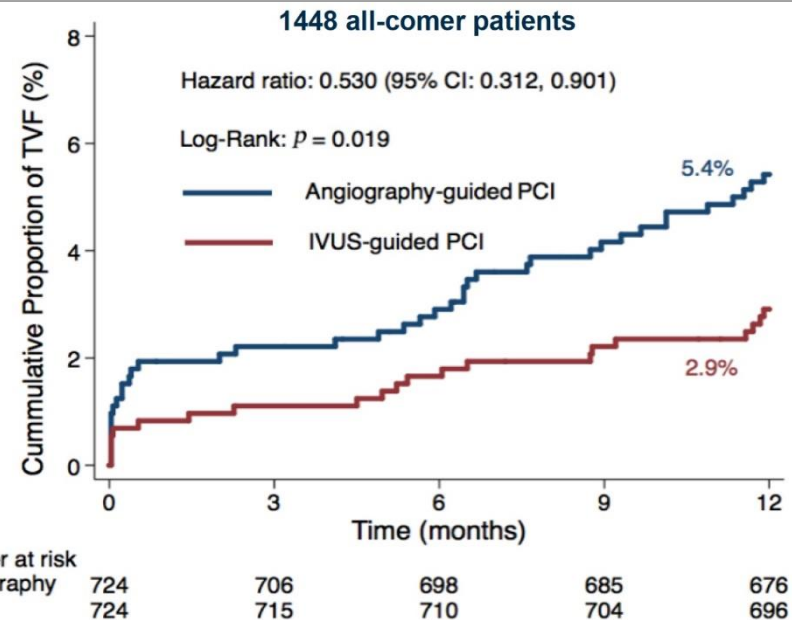


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Use of IVUS during Left main stenting
201 Pairs of Propensity-matched patients



ULTIMATE Study



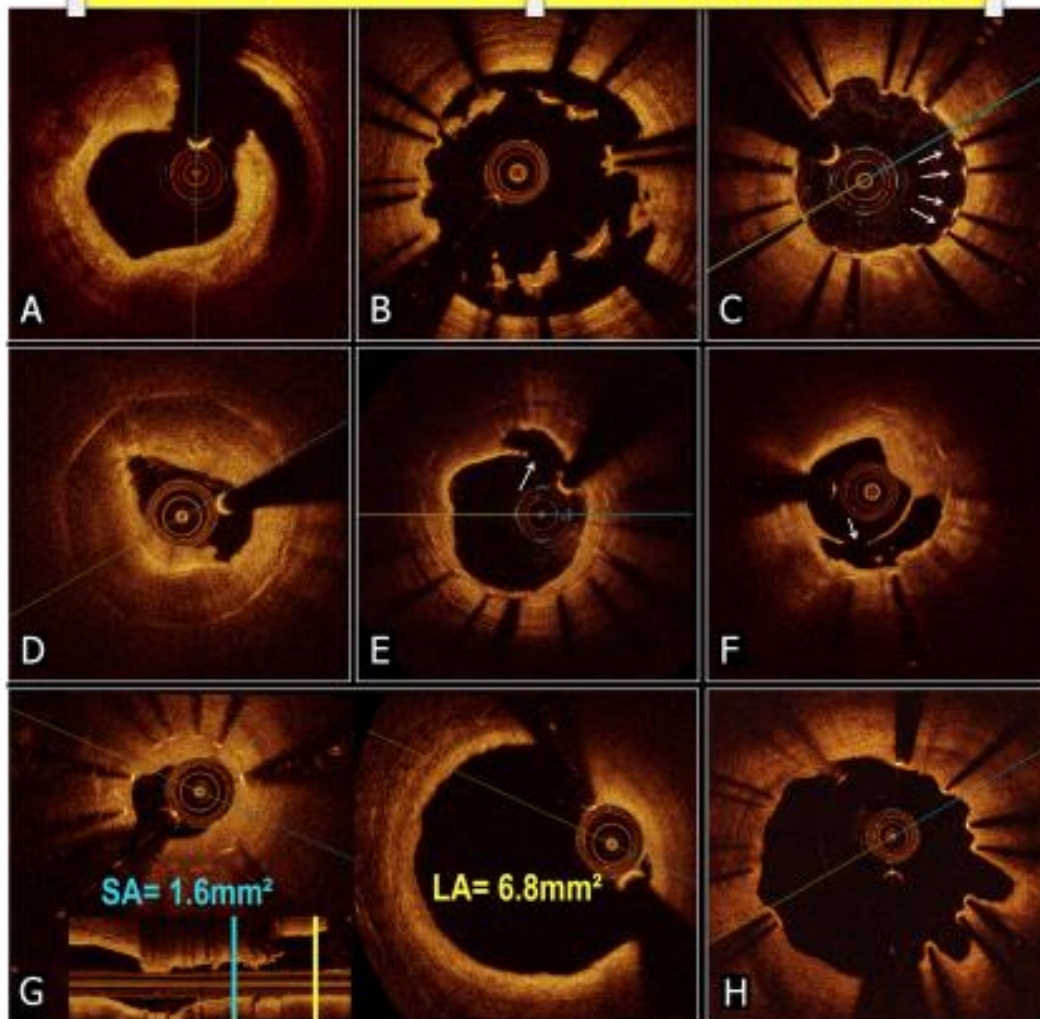
Park SJ. Circ Card Interv 2010

JACC 2018



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Complications of stenting



PESTO

Mechanisms of Stent Thromboses (n=120)

- *Malapposition 34%*
- *Neoatherosclerosis 22%*

OCT influences
management in
55% of ST cases

- *POBA 37%*
- *Medical therapy in 32%*
- *Stenting 31%*



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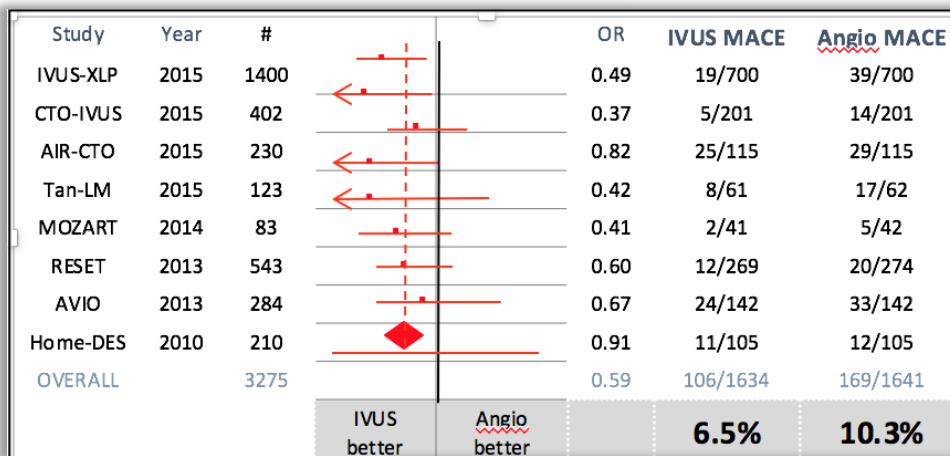
**What's the interest to perform
interventional imaging in
complex angioplasty?**



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*Meta-analysis of
8 Randomized Trials
of IVUS vs Angio-Guided
DES Implantation*

Complex lesions and IVUS
Meta-analysis : 3276 patients included
Follow-up 1.4 years



MACE
Mortality
Stent Thrombosis

x2

Events	IVUS events	Angio events	OR	95% CI	P-value
MACE	6.5%	10.3%	0.59	0.46-0.76	<0.0001
CV mortality	0.5%	1.2%	0.46	0.21-1.00	0.05
MI	0.9%	1.6%	0.58	0.30-1.11	0.10
TLR	4.1%	6.6%	0.60	0.43-0.84	0.003
TVR	5.5%	8.7%	0.61	0.41-0.91	0.02
ST	0.6%	1.3%	0.49	0.24-0.99	0.04

Elgendy. Circ Interv 2016



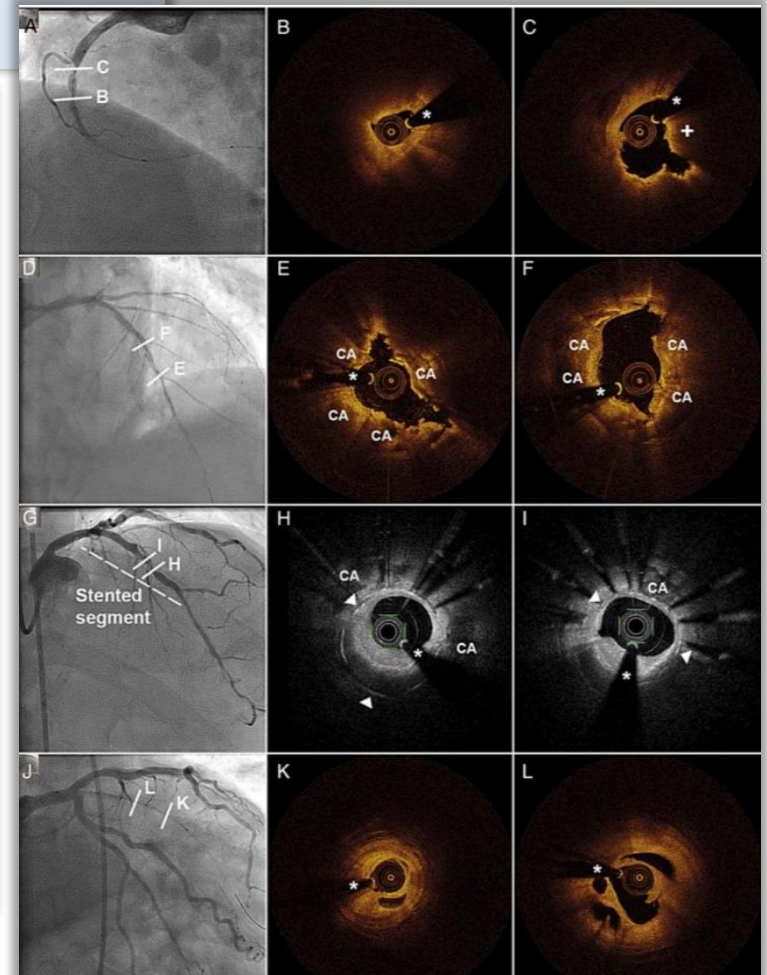
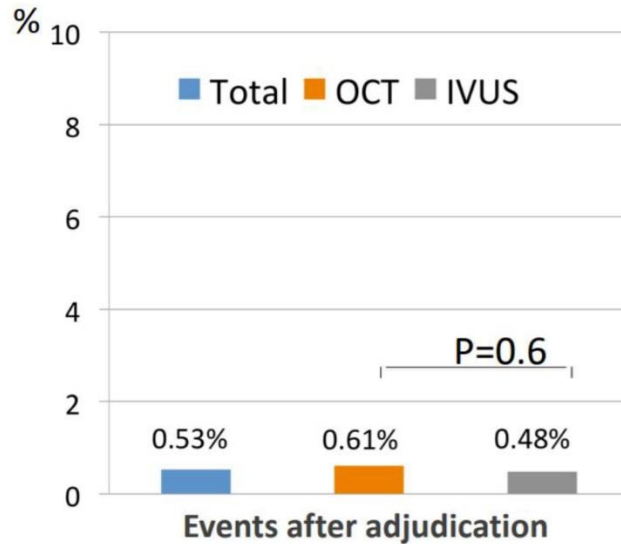
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Complex lesions and OCT The safety

Safety of optical coherence tomography in daily practice: a comparison with intravascular ultrasound

Johannes N. van der Sijde¹, Antonios Karanasos¹, Nienke S. van Ditzhuijzen¹,

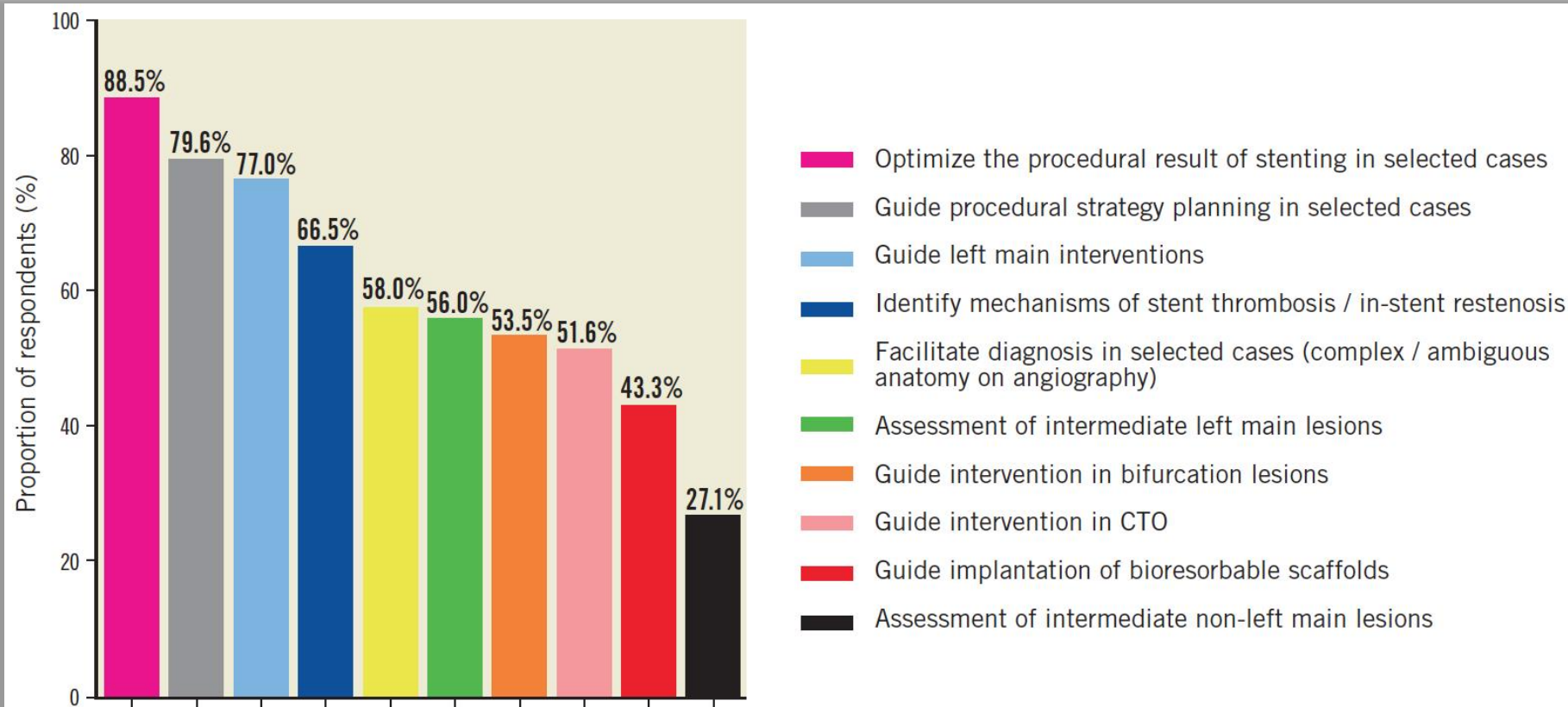
3618 consecutive coronary imaging procedures: MACE 0%





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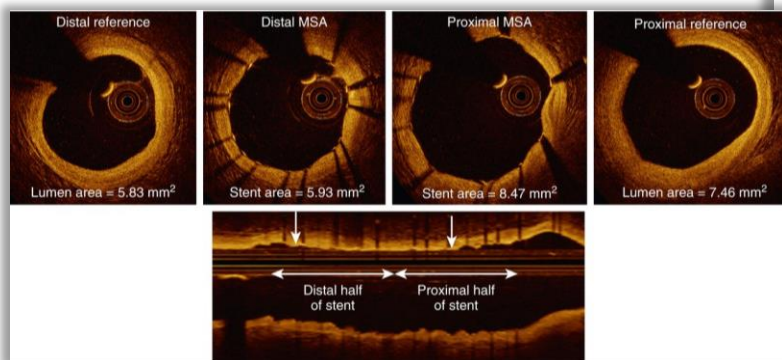
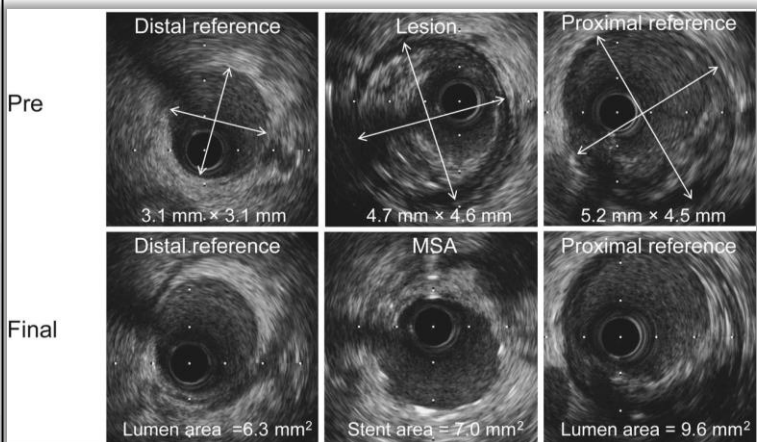
+ 1000 interventional cardiologists





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Stent Expansion

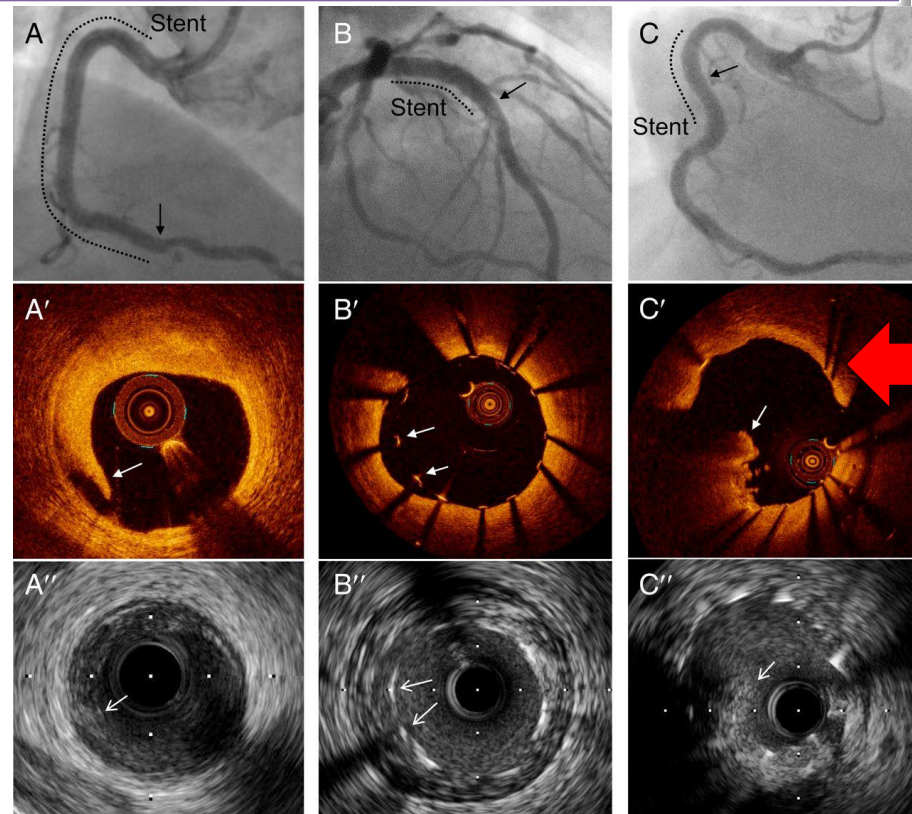


OCT			IVUS		
Very good	Good	Feasible	Feasible	Good	Very good
			Pre-PCI		
●	●	●	Severity of calcium		
			Prediction of slow flow		
	●	●	Stent sizing by vessel wall		
●	●	●	Stent length to cover normal to normal		
			Post-PCI		
●	●	●	Stent expansion		
●	●	●	Tissue protrusion through strut		
●	●	●	Stent malapposition		
●	●	●	Stent deformation (frequently at aorto-ostium)		
●	●	●	Stent edge dissection		
●	●	●	Residual disease at stent edge		
			Follow-up		
●	●	●	Old stent expansion		
●	●	●	Tissue coverage		
●	●	●	Neointimal hyperplasia		
●	●	●	Stent fracture		
●	●	●	Stent malapposition		
●	●	●	Positive remodeling of vessel wall		
●	●	●	Neoatherosclerosis		



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Dissection, Malapposition, Protrusion



OCT			IVUS		
Very good	Good	Feasible	Feasible	Good	Very good
			Pre-PCI		
●	●	●	●	●	
		●	●		
	●	●	●	●	●
●	●	●	●	●	●
			Post-PCI		
●	●	●	●	●	●
●	●	●	●	●	
●	●	●	●	●	
●	●	●	●	●	
●	●	●	●	●	
●	●	●	●	●	●
			Follow-up		
●	●	●	●	●	●
●	●	●	●		
●	●	●	●	●	●
●	●	●	●	●	
●	●	●	●	●	
●	●	●	●	●	●
●	●	●	●	●	



OCT & Complex Angioplasty

Recommendations on intravascular imaging for procedural optimization

Recommendations	Class ^a	Level ^b
IVUS or OCT should be considered in selected patients to optimize stent implantation. ^{603,612,651–653}	IIa	B
IVUS should be considered to optimize treatment of unprotected left main lesions. ³⁵	IIa	B

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IVUS = intravascular ultrasound; OCT = optical coherence tomography.



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STATE-OF-THE-ART REVIEW

Intracoronary Optical Coherence
Tomography 2018

Current Status and Future Directions



Intracoronary OCT in PCI

Pre-Intervention Assessment

- Assess plaque morphology
- Identify reference segments
- Choose stent size

Lesion Preparation and Stent Deployment

- Confirm landing zones
- Determine stent expansion

Complication and Post Procedural Assessments

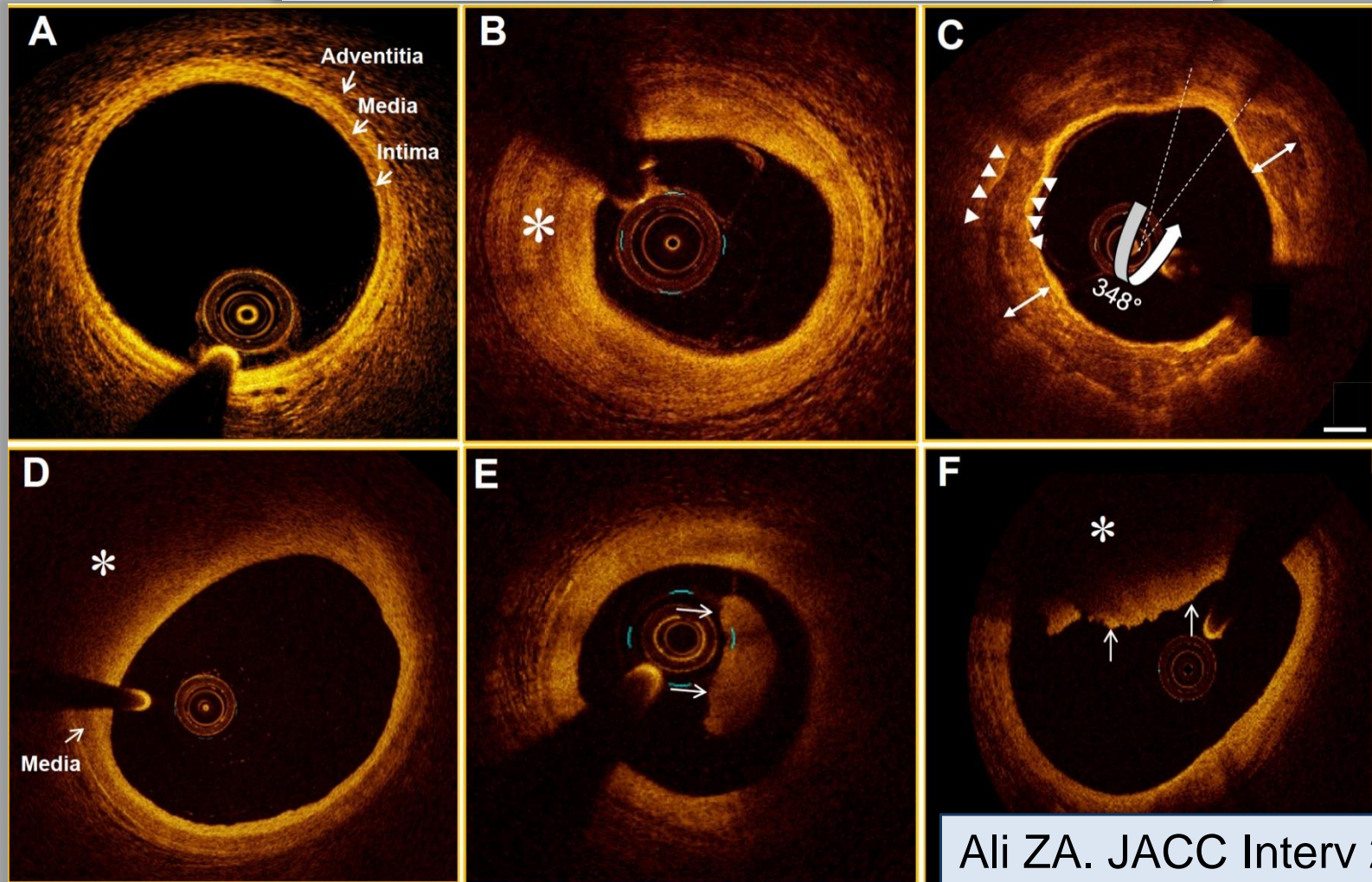
- Identify edge dissection
- Determine apposition
- Identify tissue protrusion

Ali ZA. JACC Interv 2017



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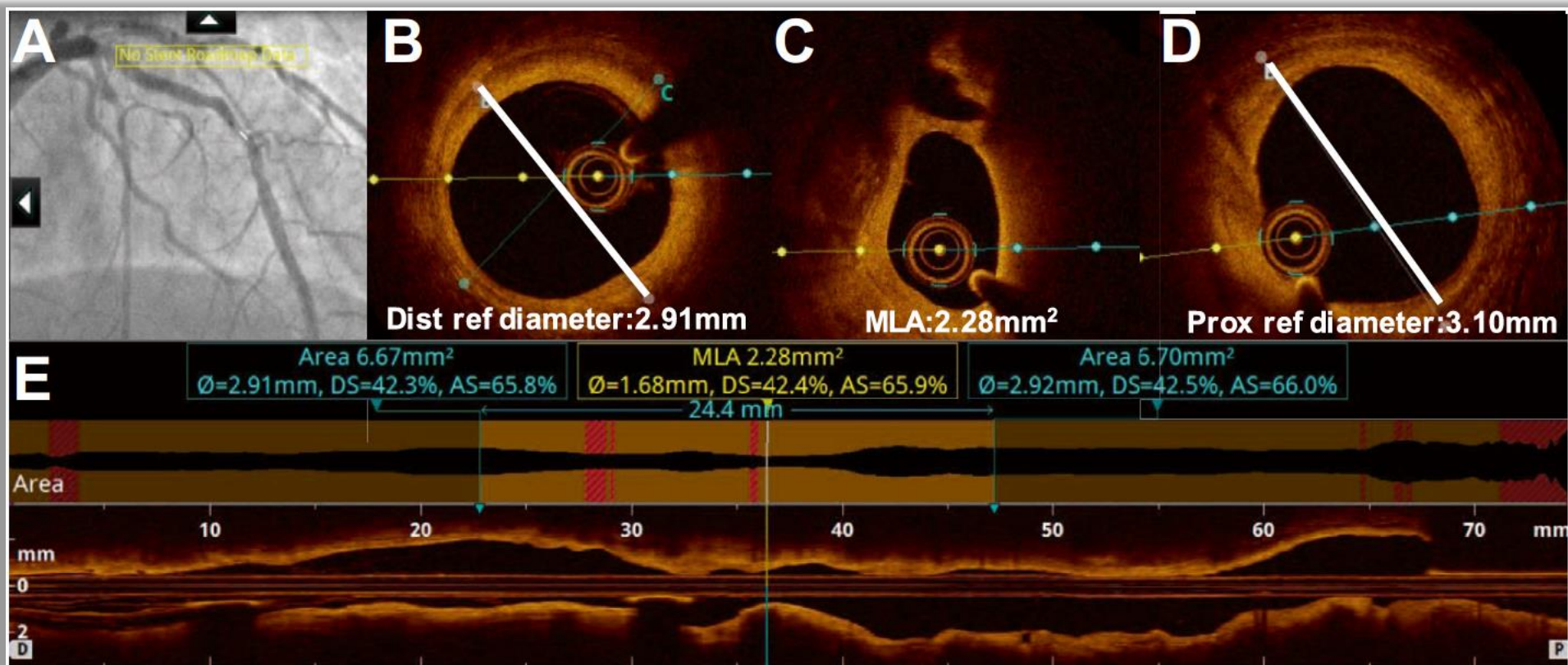
Pre-intervention assessment





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Pre-intervention assessment

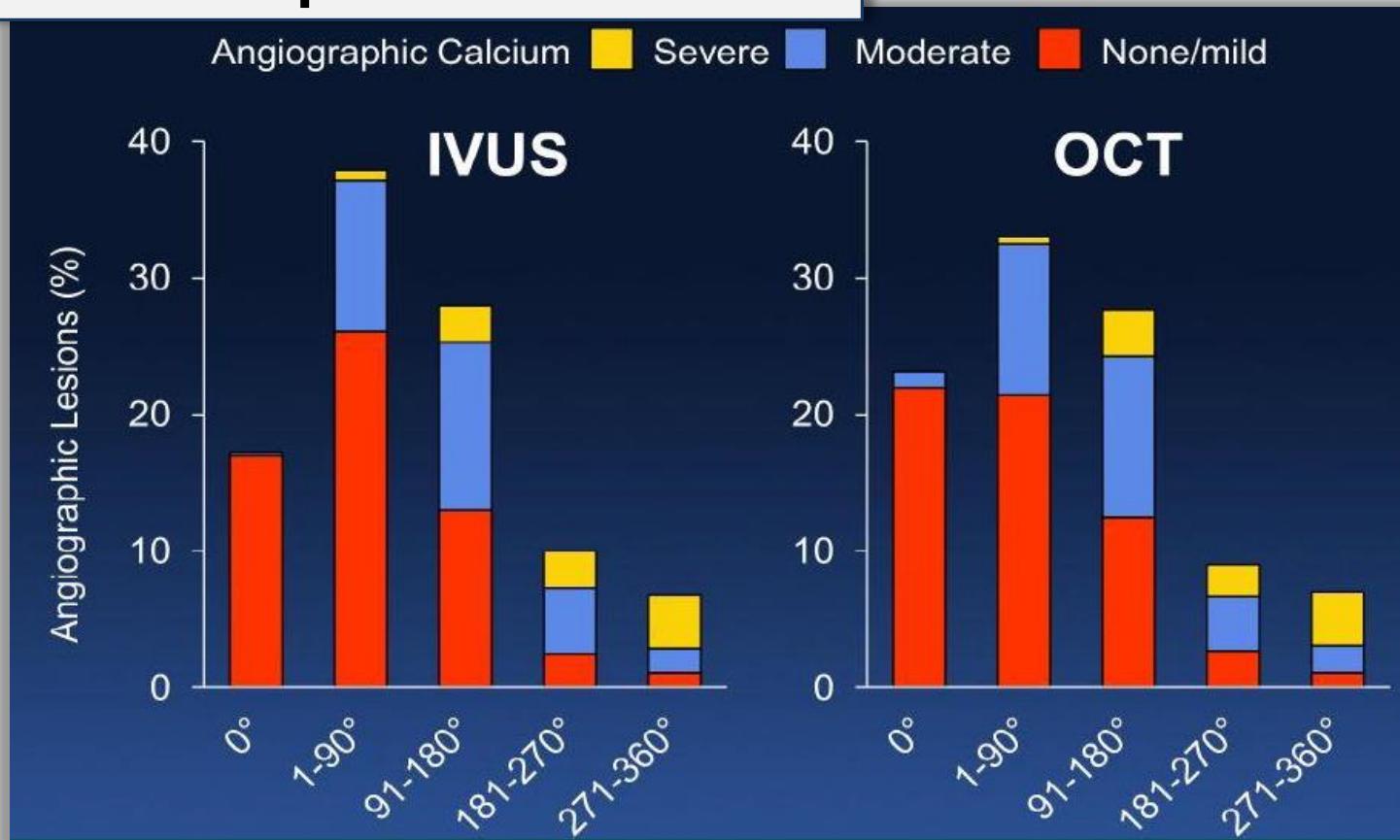




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Calcifications assessment

Angle of maximum calcium
440 patients



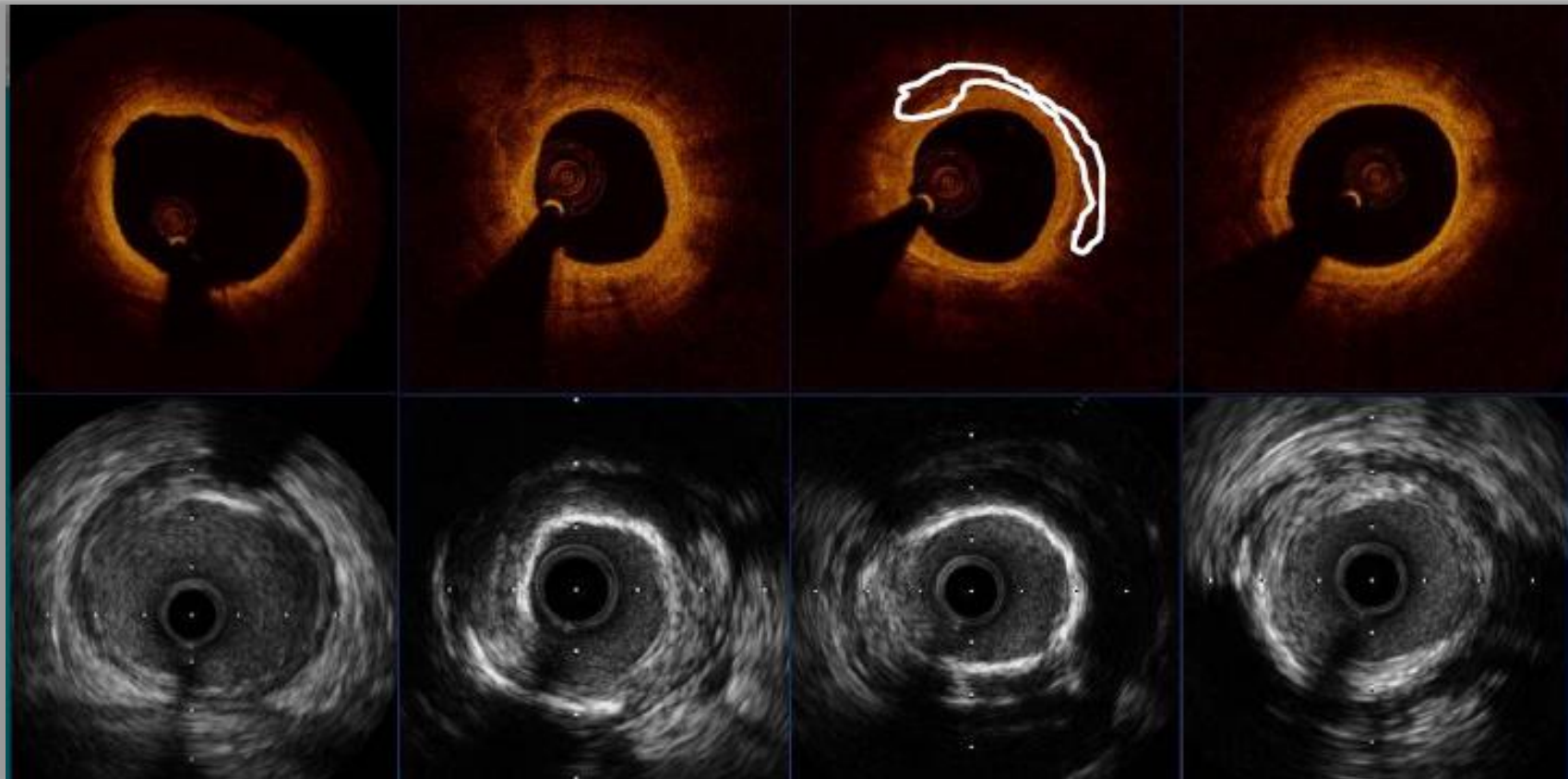


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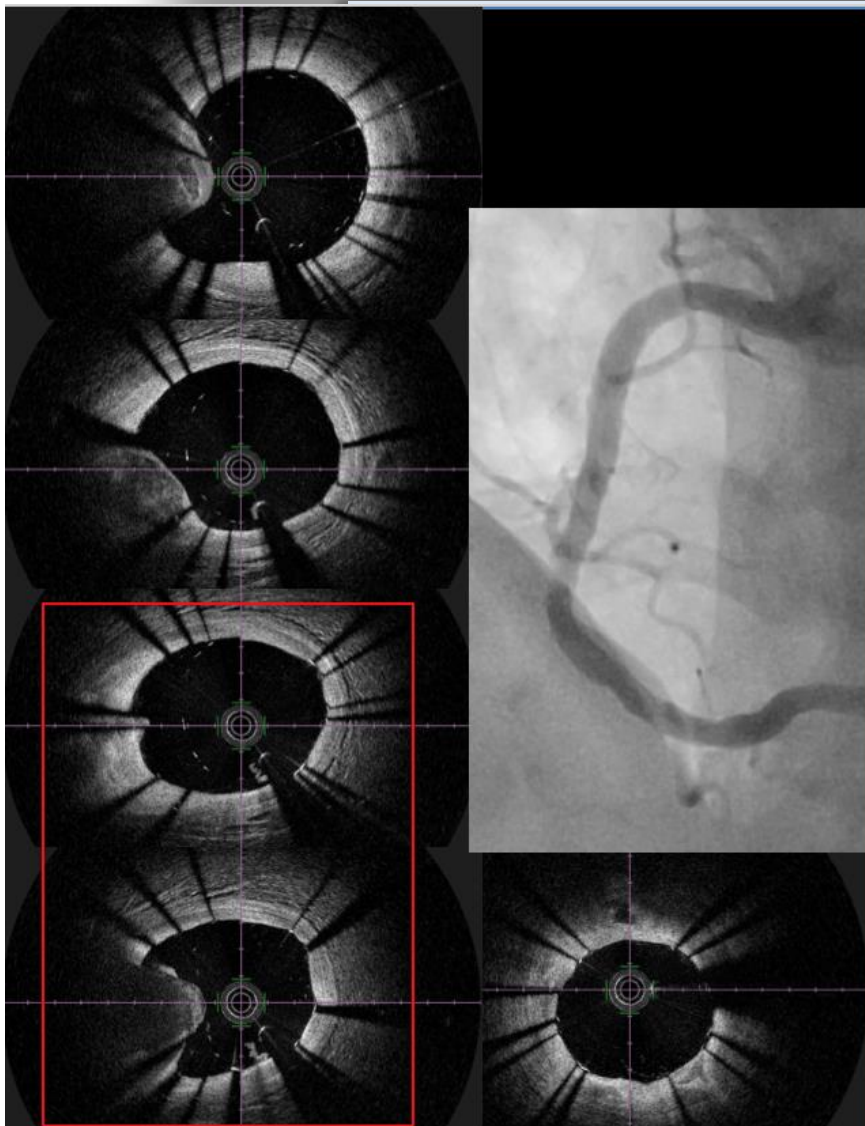
Calcifications assessment

**OCT can penetrate calcified lesion
→ estimate the thickness**

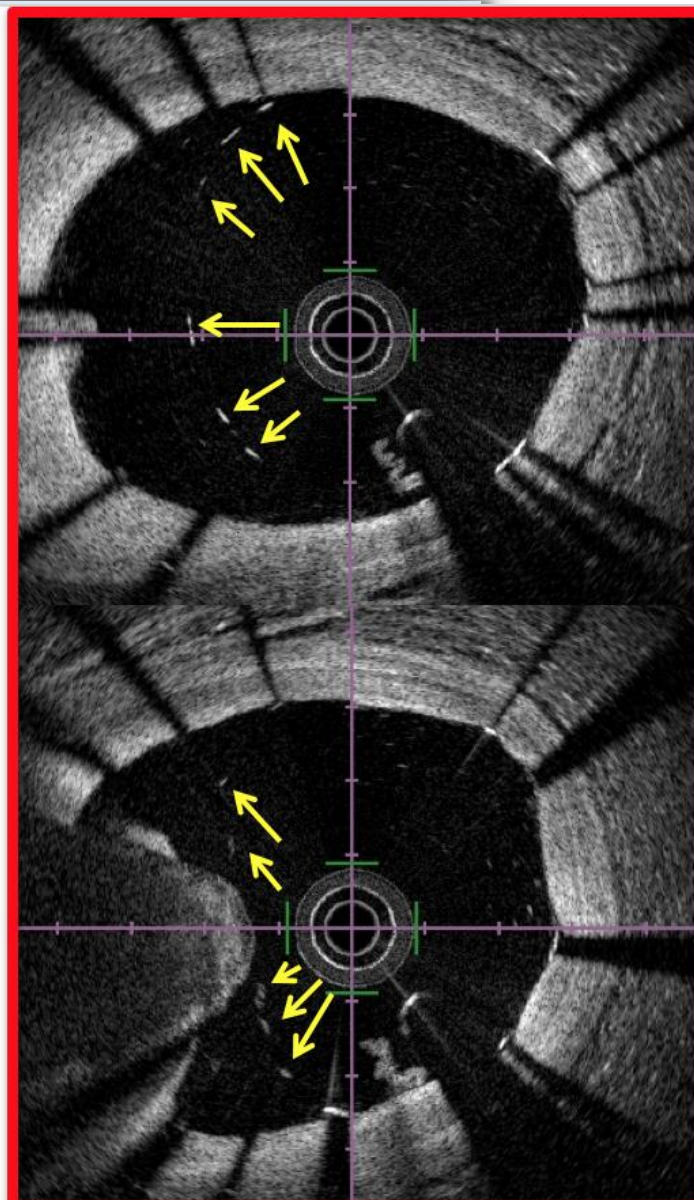




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Minimal stent area = 4.6mm





- Prospective, multicentre study
- Main objective: To evaluate the feasibility of standardized OCT-guided LM PCI using XIENCE EES & 3D OCT protocols
- Secondary objectives: To evaluate the safety & efficiency of standardized OCT-guided LM PCI

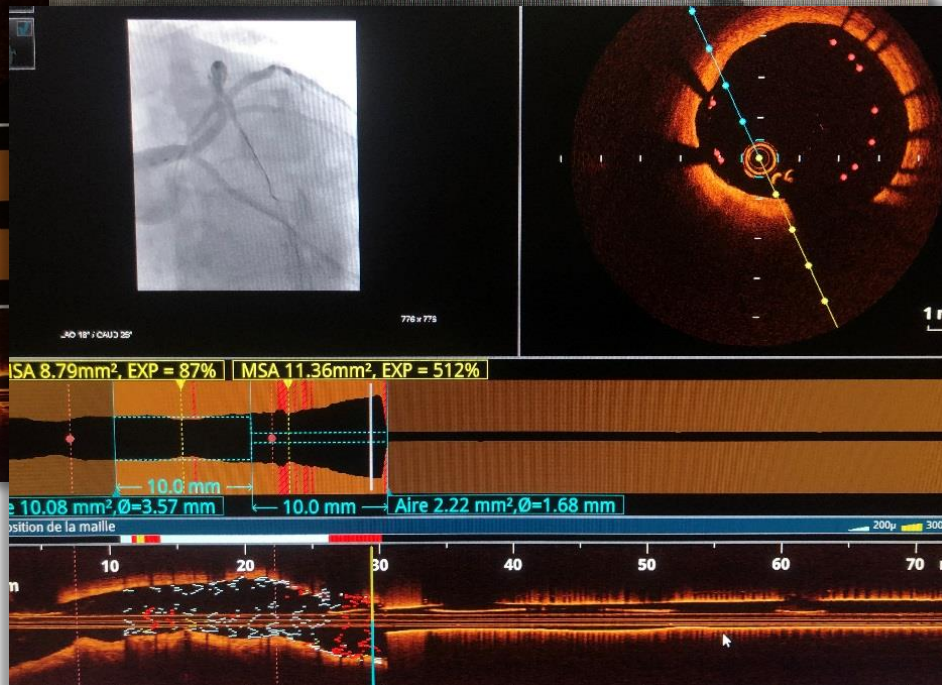
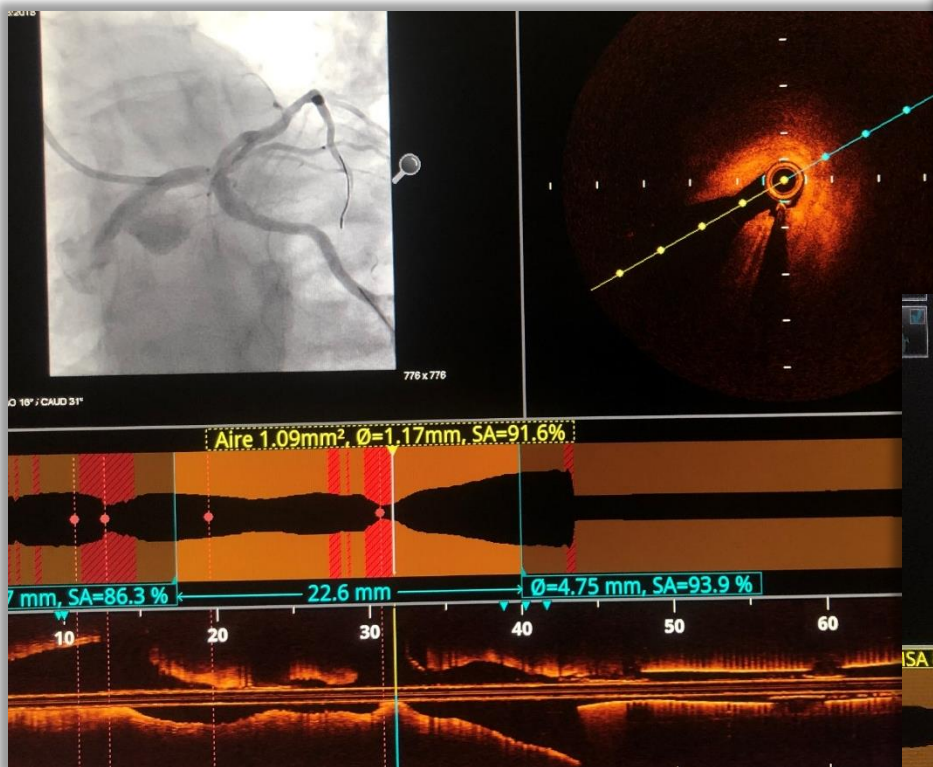
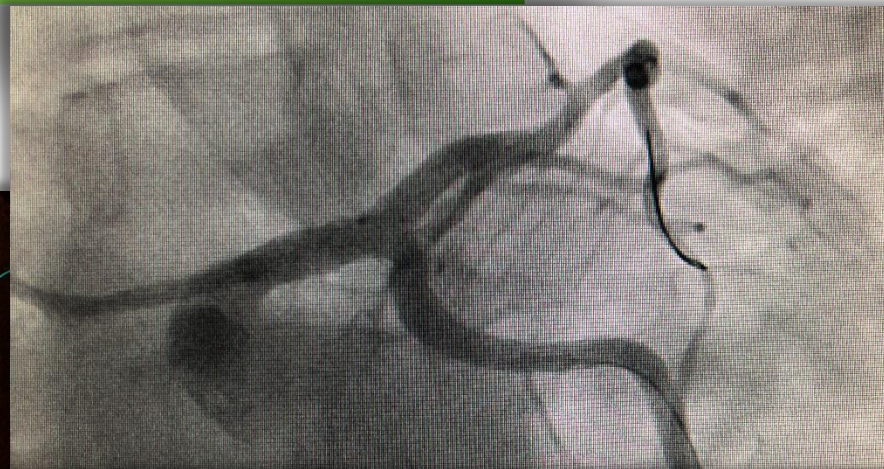




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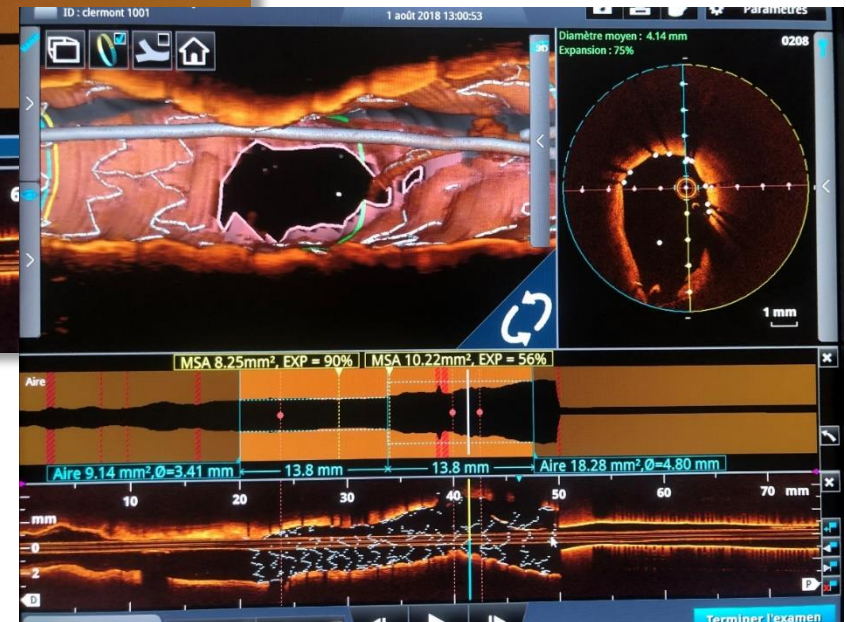
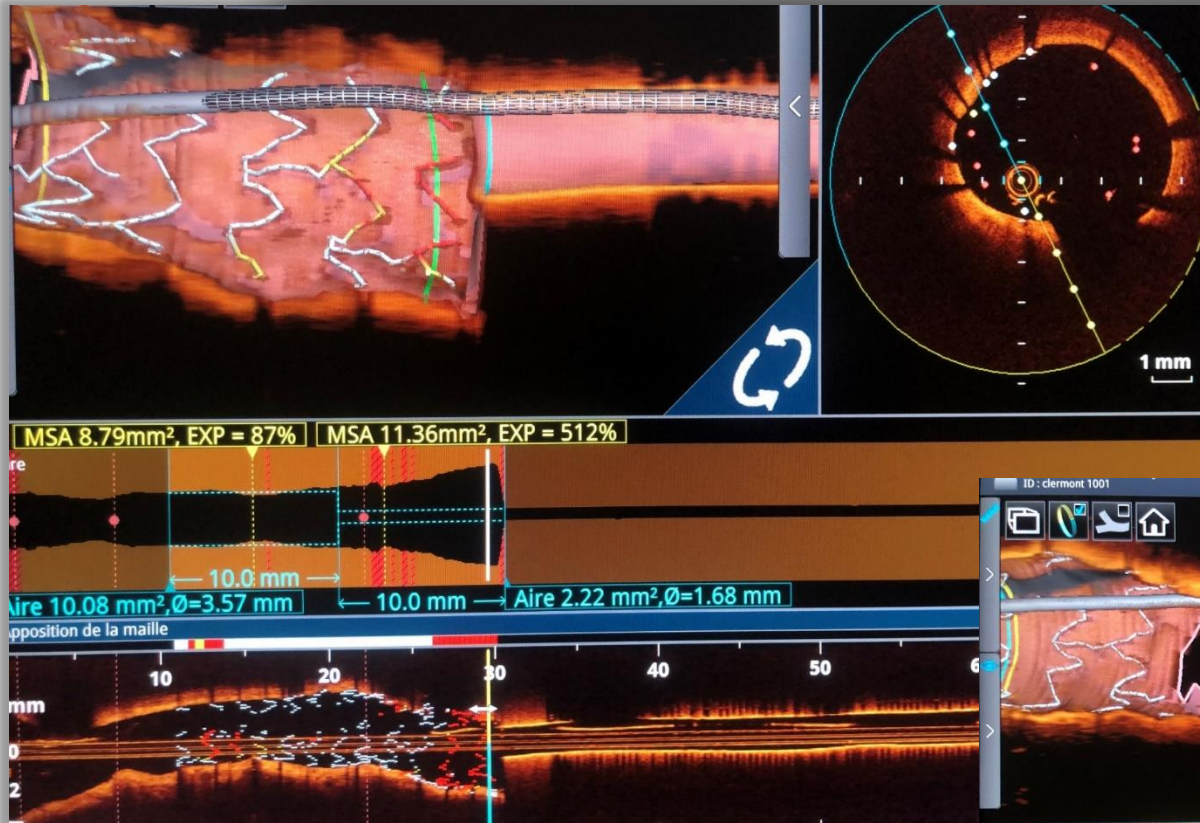


Left main angioplasty





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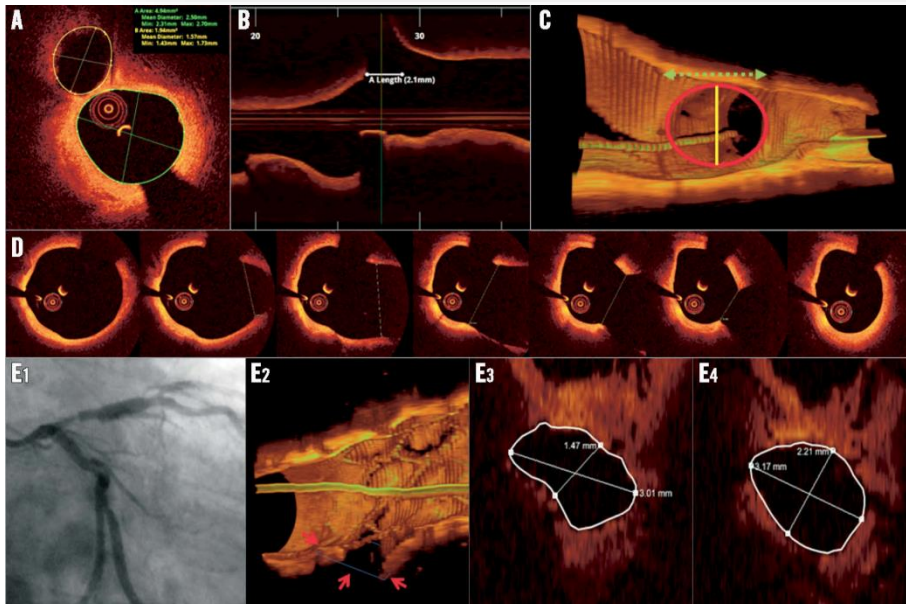
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Bifurcation lesions

OCT for bifurcation stenting: what have we learned?

Niels Ramsing Holm^{1*}, MD; Tom Adriaenssens², MD, PhD; Pascal Motreff³, MD, PhD; Toshiro Shinke⁴, MD, PhD; Jouke Dijkstra⁵, MD, PhD; Evald Høj Christiansen¹, MD, PhD



- Evaluation bifurcation
- Ostium Side Branch
- Planification stenting
- Position of the wire
- post stenting control
- New devices evaluation
- Explanation of complication

Holm NR, Eurointervention 2015

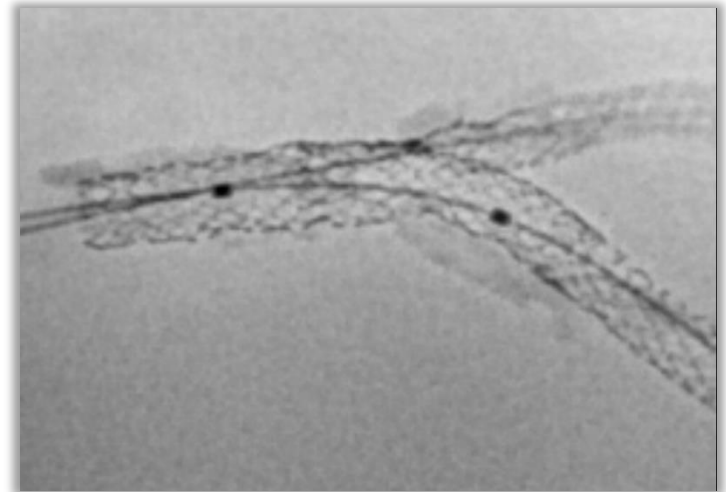


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**DK crush angioplasty
60 years**

Coro 1/2019



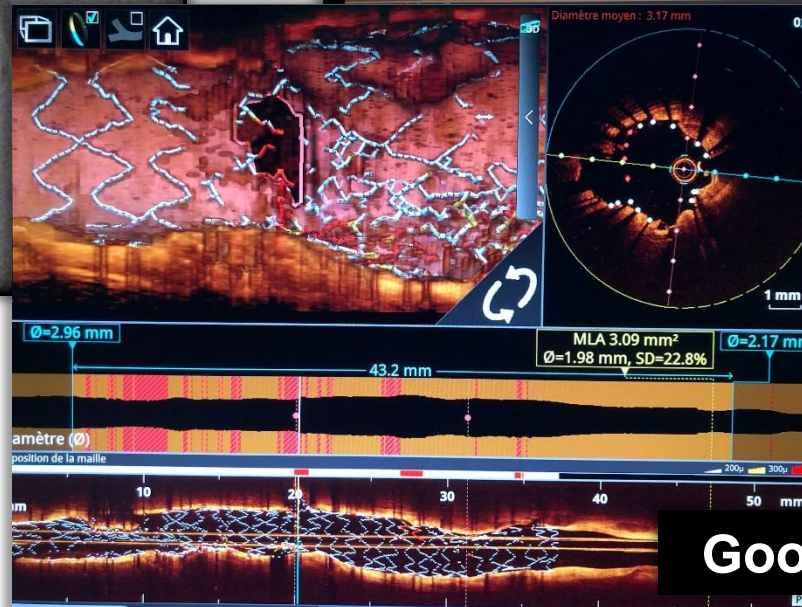
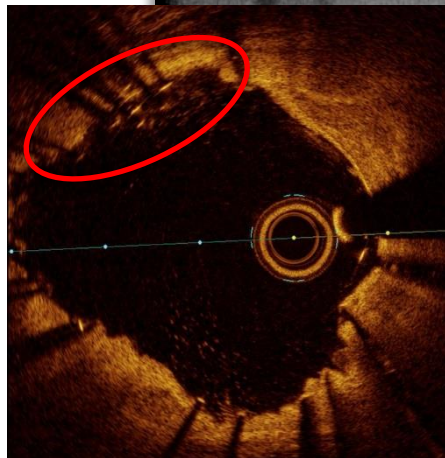
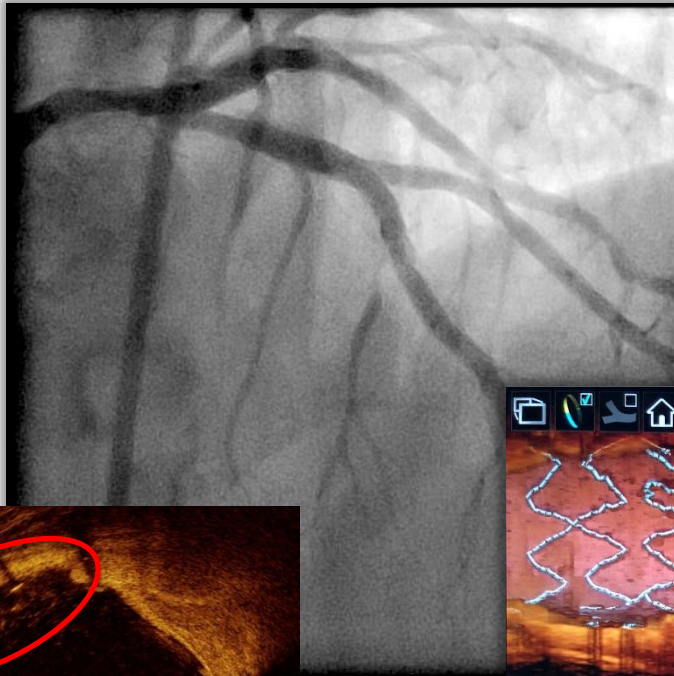
Good Evolution



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DK crush angioplasty

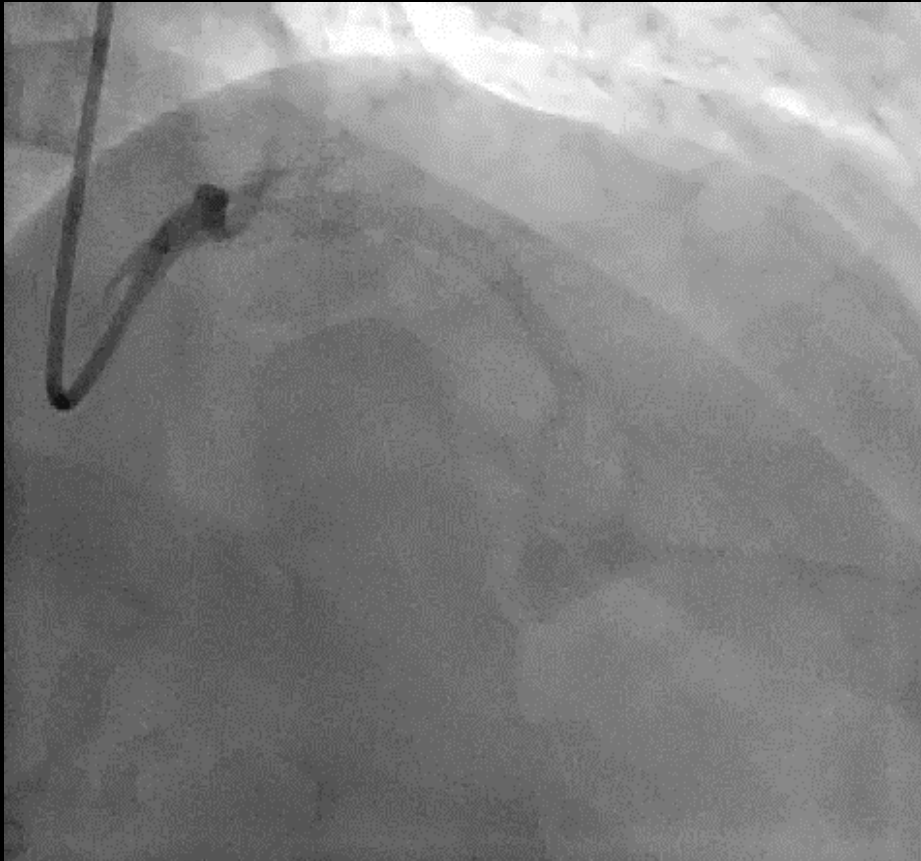


Good Evolution



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**64 years old
ATL RCA and LAD in 2104 with DES
ACS in 2018. Troponin +**

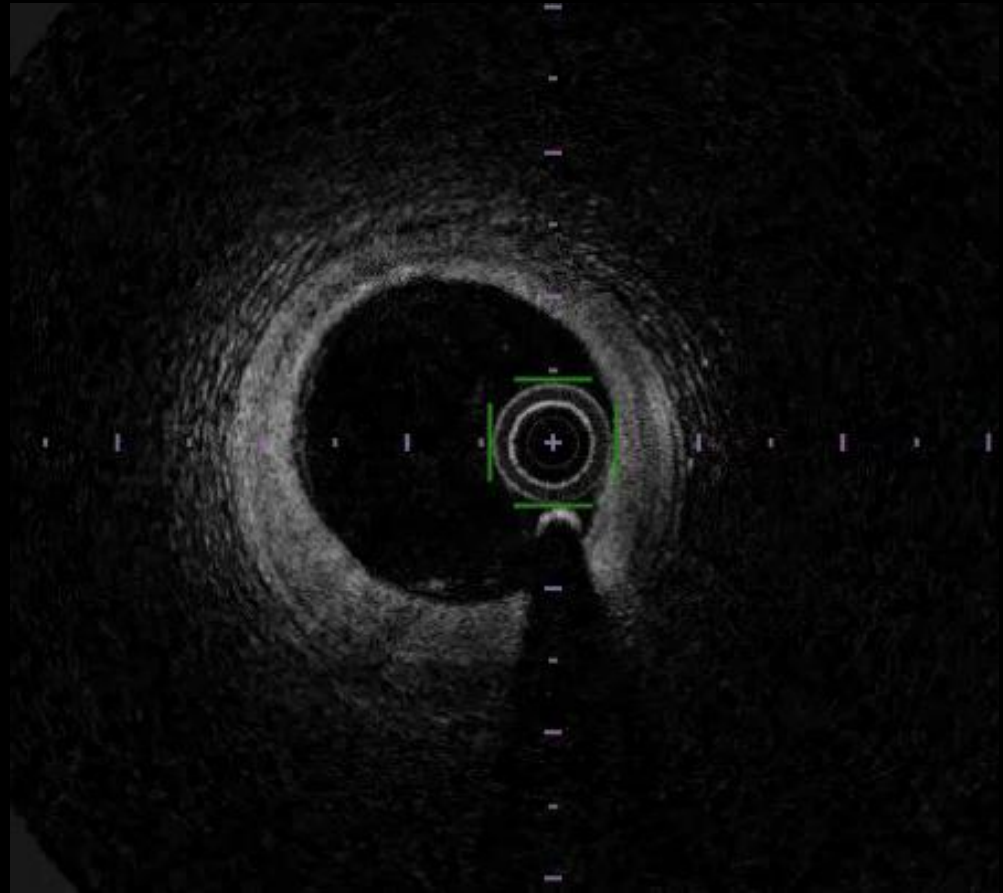
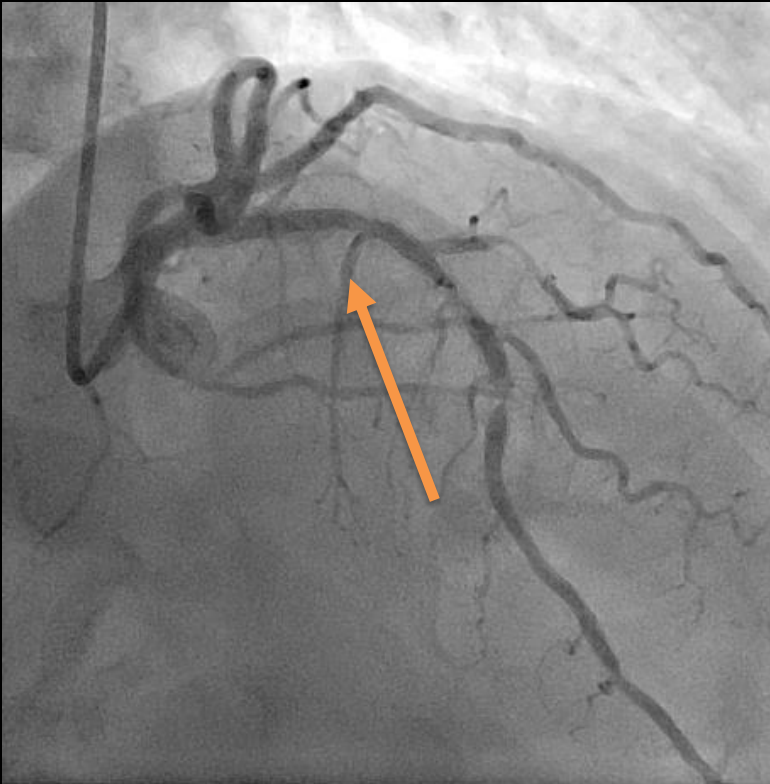


What's your opinion?



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OFDI



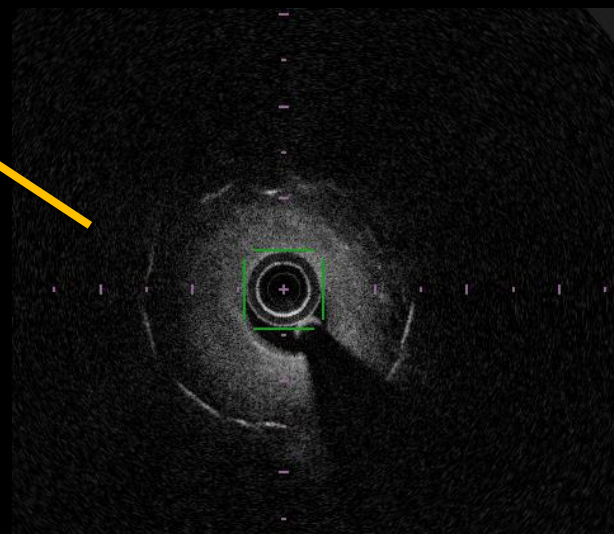
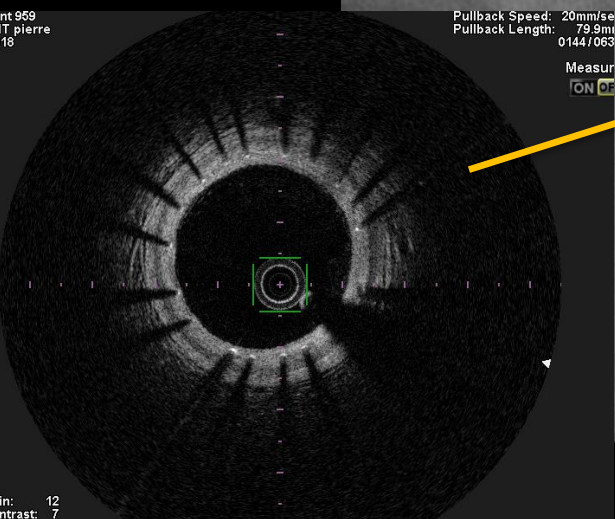
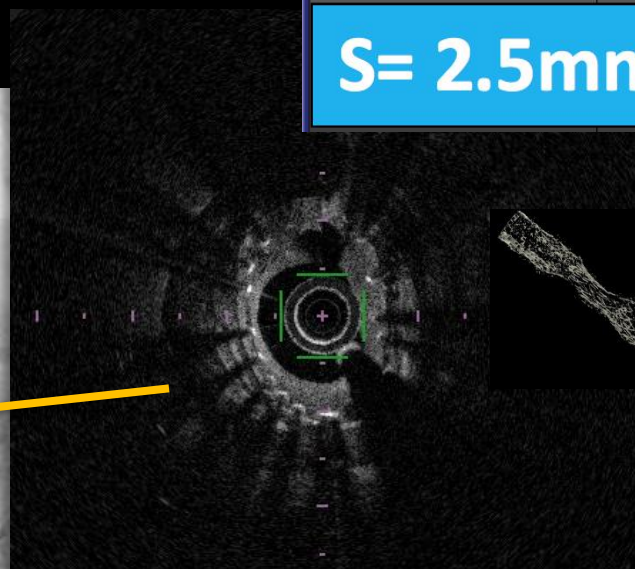


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OFDI

Measurement		Value
► Lumen Mean Dia.		1.34 mm
▼ Stent Mean Dia.		1.79 mm
Area		2.5 mm ²
Min. Dia.		1.67 mm
Max. Dia.		1.93 mm

S= 2.5mm²

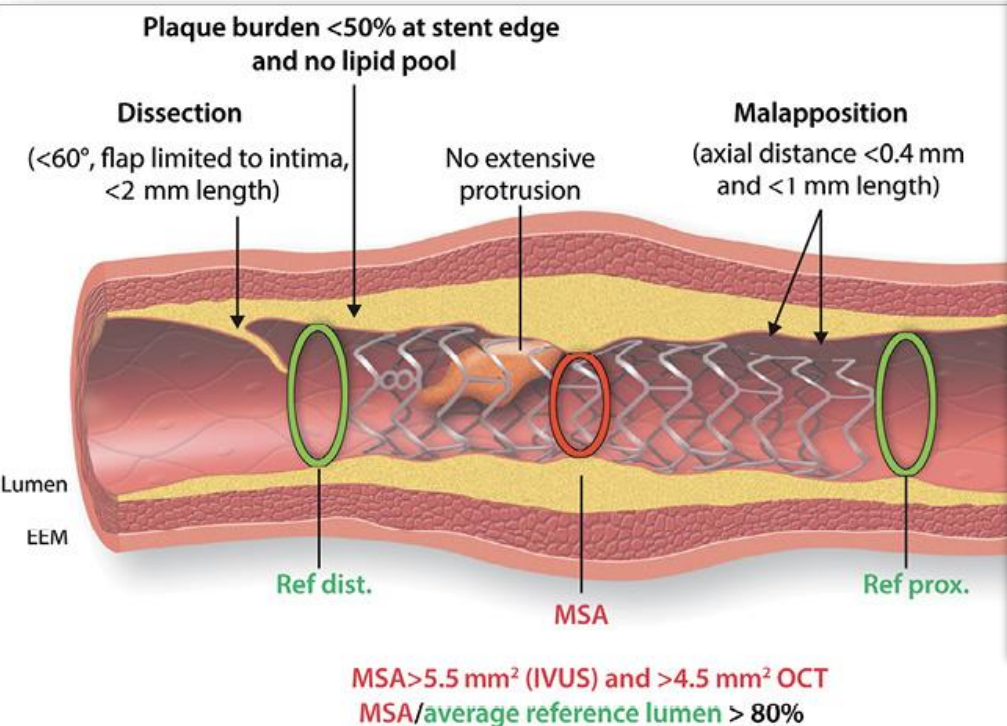


in: 12
contrast: 7



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Post-intervention assessment



Acceptable

Dissection <60°, intimal, longitudinal extension <2mm
burden plaque <50%
No protrusive extension
Malapposition <400µm in less than 1mm
MSA > 4.5mm² in OCT
Expansion > 80%



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Recommendations of the adjunctive use of intravascular imaging for diagnostic evaluation of coronary artery disease, guidance and optimization of PCIs

Diagnostic assessment of coronary lesions

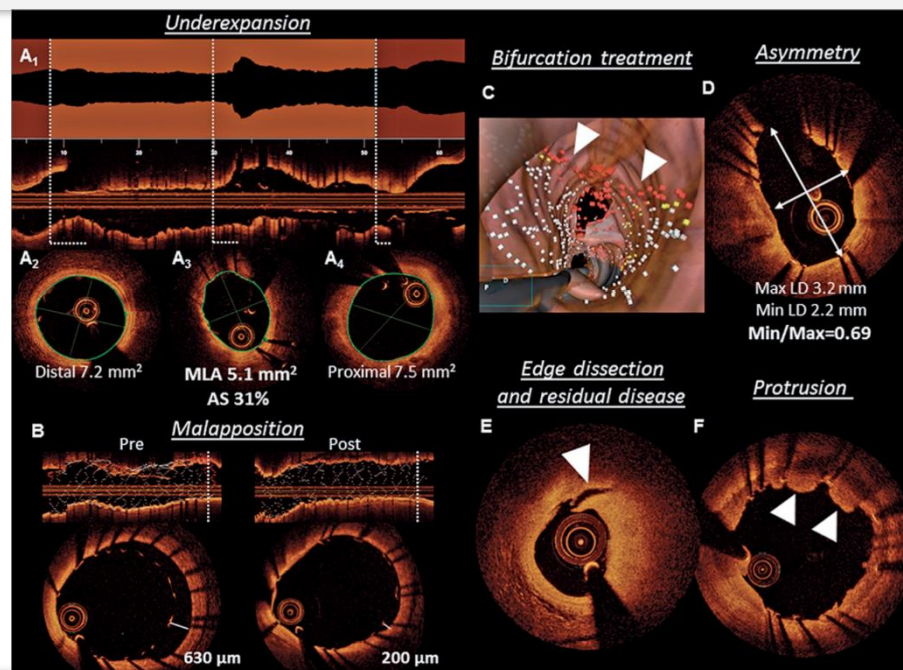
Consensus opinion	Angiographically unclear/ambiguous findings (e.g. dissection, thrombus, calcified nodule)
	Assessment of left main stenosis
	Complex bifurcation lesions
	Suspected culprit lesion of ACS

PCI guidance and optimization

RCT evidence	Long lesions
	Chronic total occlusions
Consensus opinion	Patients with acute coronary syndromes
	Left main coronary artery lesions
	Two stents bifurcation
	Implantation of bioresorbable scaffolds
	Patients with renal dysfunction (IVUS)

Identification of mechanism of stent failure

Restenosis
Stent thrombosis



Guidance and Optimization of Coronary Interventions
An expert consensus document of the EAPCI

L.Raber Eurointervention 2018



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Limitations

- **Catheters are expensive**
- **Long procedures with contrast injection**
- **Ability to cross the very tight stenosis**
- **Thrombus for the interpretation**
- **Ostial lesions**

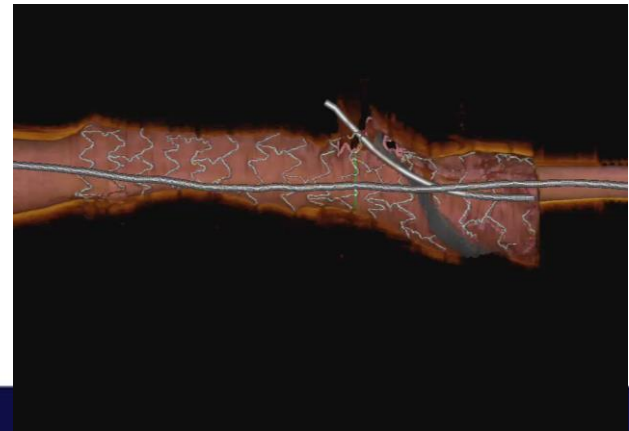
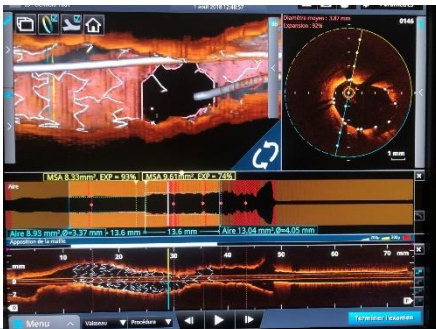


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Conclusions

- We have to learn the Lessons from IVUS or OCT when we use angiography alone
- IVUS or OCT are strongly recommended :
 - During the learning curve of Left Main-PCI
 - In complex cases
 - Angiographic ambiguities (lesion, procedure)
 - Stenting failure





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